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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/635,539

08/07/2003

Haruko Akutsu

03180.0329

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22852

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05/04/2006

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER
LLP

901 NEW YORK AVENUE, NW
WASHINGTON, DC 20001-4413

EXAMINER

PHAM, HOA Q

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 05/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/635,539

Applicant(s)

AKUTSU ET AL.

Examiner

Hoa Q. Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 1-4, 12, 13, 18 and 19 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14-17 is/are allowed.
- 6) ☒ Claim(s) 5-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>8/7/03 & 7/21/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of species (a) (claims 5-11 and 14-17) in the reply filed on 4/21/06 is acknowledged.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

3. The drawings filed on 8/7/03 have been accepted.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carver (4,652,757) in view of Tamai et al (4,904,902).

Regarding claim 5, Carver discloses a method and apparatus for optically determining defects in a semiconductor material comprises a pump laser (52) for projecting a pump beam modulated at a modulated frequency on a semiconductor

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wafer, a probe laser (62) for irradiating a probe beam on the semiconductor wafer and a detector (72) for detecting reflection of the probe beam from the semiconductor (figure 3). Carver does not explicitly teach steps of reducing charge trapped in a surface of a semiconductor wafer and implanting ions in the semiconductor wafer. However, such a feature is known in the art as taught by Tamai et al. Tamai et al discloses an ion implanting system in which the steps of reducing charge trapped in the surface of wafer (35) and implanting ions in the semiconductor wafer are well known in the art (see column 1, lines 17-58 and figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the basic device of Carver for detecting the defects of semiconductor wafer in an ion implanting system as taught by Tamai et al. The rationale for this modification would have arisen from the fact that by including the steps of reducing charged trapped in a surface of a semiconductor wafer and implanting ions in the semiconductor wafer would protect the damages to the wafer due to the charge-up as suggested by Tamai et al (column 1, lines 41-48).

Regarding claims 6-7, it would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the step of reducing charge trapped in a surface of a semiconductor wafer by terminating crystal defects in the wafer with hydrogen atoms or expose the surface of the wafer to a dilute hydrofluoric acid solution because these steps are function in the same manner.

Regarding claim 8, see column 1, lines 27-41 and column 2, lines 25-36 for forming an insulating film on the surface of the wafer. Thus, it would have been obvious

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to one having ordinary skill in the art at the time the invention was made to form the insulating film after reducing charge and before the implanting ions.

Regarding claims 9-10, see figure 1 of Tamai et al for the use of wafer disk (31) on which the wafers (35) are located.

Regarding claim 11, Carver does not explicitly teach measuring intensity of a reflection of the probe beam from the wafer after irradiating the pump beam on the wafer for at least three seconds. However, due to the unstable of the intensity of the pump beam, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make a measurement after the pump beam irradiating for at least three seconds, thus an accuracy of the measurement is obtained.

Allowable Subject Matter

6. Claims 14-17 are allowed.

7. The following is a statement of reasons for the indication of allowable subject matter: There was no prior art found by the examiner that suggested modification or combination with the cited art so as to satisfy the combination of all the limitations in claim 14. The prior art of record, taken alone or in combination, fails to disclose or render limitations **“finding a first functional form indicating a relation between a first elapsed time period from a time when ions were implanted into the semiconductor wafer to a time when the intensity of the reflection was measured and intensity changes of the reflection” and “finding an intensity of the reflection just after the ions were implanted into the semiconductor wafer according to the**

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intensity of the reflection measured, the first elapsed time period, and the first functional form”, in combination with the rest of limitations of claim 14.

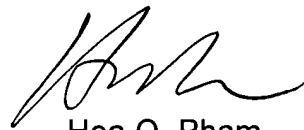
8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Following references relate to modulated reflectance measurement system: Nicolaides et al (2003/00234933A1 and 6,917,039), Salnik et al (2004/0253751A1 and 2005/0062971A1) and Takase et al (JP-410255714A).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoa Q. Pham whose telephone number is (571) 272-2426. The examiner can normally be reached on 7:30AM to 6 PM, Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Hoa Q. Pham
Primary Examiner
Art Unit 2877

HP
April 28, 2006